The biological essence of law

Gommer, H.

Published in:
Ratio Juris: An International Journal of Jurisprudence and Philosophy of Law

Publication date:
2012

Document Version
Early version, also known as pre-print

The Biological Essence of Law

Summary

Law, this paper contends, is in essence an evolutionary phenomenon that can, and indeed should, be studied in the light of biological mechanisms. One could see law as an extended phenotype of underlying genes. In addition, legal systems will be congruous to genetic mechanisms. Properties of genes have impact on legal systems in a fractal like manner. In this way, it is not surprising that notions of stability, replication and reciprocity that are important in biological systems, as well will be important in human legal systems. Legal systems therefore will be constructed in a way that it is congruent with genetic advantage of the group members. Law, exposure and punishment can diminish deviant behaviour to restore balance. Law will not particularly be subject to natural selection, but it certainly will be build on the foundations of natural selection.

Remark: This manuscript has not yet been edited. Please ignore mistakes in English language at this point.

The Biological Essence of Law

HENDRIK GOMMER*

Introduction

Law, this paper contends, is in essence an evolutionary phenomenon that can, and indeed should, be studied in the light of biological mechanisms. In addition, evolutionary biology is one of the perspectives that can increase our understanding of the principles of law. This position is at odds with what Leiter and Weisberg are saying: 'Evolutionary biology offers nothing to law – more precisely, it offers nothing to help with questions about legal regulation

* Dr. Hendrik Gommer is Assistant-Professor Biology and Law, Philosophy of Law and General Law at the University of Tilburg. He has a degree in Law, Biology and Science of Religion. In 2009 he introduced Law and Biology as a Master course in the Netherlands.

of behaviour.'[1] Many jurists will agree. I think they are mistaken. To be sure, we should be careful in applying biological mechanisms to legal subjects, yet we may more fully grasp the nature of law by bringing the two disciplines together. Certainly, it can be dangerous to translate biological facts from experiments on animals in normative arguments about how people should behave; recent scientific history abounds in examples of how easy it is to draw wrong conclusions.[2] It is currently also difficult to use evolutionary biology to determine which legal incentives should be used to regulate behaviour, not least because we do not exactly know *to what end* we should regulate behaviour. However, these caveats do not imply that law cannot be seen as a kind of extended phenotype that can be studied with aid of biological mechanisms.[3] With the right genes, an organism can build a shelter, thereby improving not only its survival chances but also the replication chances of its genes.[4] It is reasonable to assume that law systems in a congruent way are a consequence of this property of genes to create stable, extended phenotypes. From this perspective, the building blocks of law systems are the same as the building blocks of physical phenotypes.

Genes are stable molecules that can replicate and spread over a population. They flourish in stable systems such as cells, complex organisms and societies. The stability of genetic molecules and the potential stability of such features of human civilizations as religion, nationalism and law can mutually reinforce each other.[5]

---

[1] B. Leiter and M. Weisberg, 'Why Evolutionary Biology Is (So Far) Irrelevant to Legal Regulation', *Law and Philosophy* 12 May 2009.

[2] We should always remember the ideas of Sir Francis Galton who was the father of study of the possibility of improving the qualities of a human population by discouraging reproduction by persons having genetic deviations, the eugenetics. Galton, F., *Inquiries into Human Faculty and its Development*. London: Macmillan 1883. The era in which these ideas came into practice has ended not so long ago. Adolf Hitler even incorporated these ideas in Mein Kampf and eugenetics in a sense was legitimating the holocaust.

[3] Richard Dawkins developed the extended phenotype concept in his eponymous 1983 book.

[4] R. Dawkins, *The Extended Phenotype*, Oxford: Oxford University Press 1983.

[5] E.g., R. Vaas and M. Blume, *Gott, Gene und Gehirn*, Stuttgart: Hirzel Verlag 2009.

Not that law systems are subject to natural selection, but because they have grown on the foundations of natural selection, they will inherently will be in line with genetic mechanisms. In this way, law systems can be to the benefit of groups, individuals and indeed underlying genes. The metaphor of a building is perhaps enlightening. Imagine, we have the foundation of an ancient Roman temple. An architect gets the assignment to build a modern building on top of this foundation. The new building will probably have a new appearance, but the building will have the same measures and will be not much higher than the original temple. The building will also protect the ancient foundation and will cause it to survive longer.

We know that there are many social systems in the nonhuman world where rules, rule following, punishment for rule breaking, and even third party punishment are to be found. The forming of a law system therefore, is not unique. One could see law as an extended phenotype of underlying genes. Then, it is not surprising that notions of stability and reciprocity that are important in biological systems, as well will be important in human legal systems. Stability, replication and reciprocity are important at the gene level. They are also important at the legal level. Legal systems therefore will be constructed in a way that it is congruent with genetic advantage of the group members. I will argue that the basis of legal systems can be found at the level of genes. I will describe some important characteristics of genes. In addition, I will formulate seven Provisional Laws in order to clarify the relation of genetics and law. In this way, it should be possible to formulate some basic universals of human law systems. At the same time, I will try to deal with some apparent antinomies in the current theories on evolution of culture, and therefore of law. I will do this by introducing fractal theory.

The gene as fractal generator

All human systems and constructs ultimately go back to those stable, replicating molecules we call genes. Without genes there is no DNA, without DNA no RNA, without RNA no proteins, without proteins no organs, without organs no humans, without humans no human traits and behaviour, without behaviour no uniquely human institutions such as religion, nationalism and

law.[6] In essence, it is simple as that. Genes are a *sine qua non* for human behaviour. Not *one* sine qua non, but the most important sine qua non, although replicating molecules cannot replicate without external factors. They need a medium to prosper; they need molecules as 'food' to replicate.

Perhaps, this point can be clarified by introducing fractal theory. Fractals are objects of which the smallest particles have the same structure as the composition of these particles.[7] The so-called Cantor set is probably the simplest fractal. A line can be divided in two lines, each of these lines can be split in two new lines. The result is many short lines with gaps between them. The macrostructure resembles the microstructure.[8]
The Swedish mathematician developed the Koch curve, filling the gaps in a straight line with new, equally angled lines in a repetitive process. With every step more 'bulges' are added. The initial, straight line is called the *initiator*, the repeating action the *generator*.[9]
Fractals can also be recognized in the coast of Great-Britain, which superficially shows only big coves. More detailed charts show smaller coves. The number of coves increases with the degree of detail. This is an example of a *scaling relationship*.[10] Note that nowhere are the coves identical, but the structure – the principle, the plan – is the same. The coast evolved in a situation where the environment was not as homogenous as the piece of paper on which computer drawings are made. A fractal's environment will influence its eventual form.
Fractals manifest themselves in apparent chaos by random processes. Because of the generator, ordered structures will appear in chaos. The pattern of many natural structures – a snowflake, leaves, cell growth, lungs, our brain – approximates a fractal. Chaos combined with a generator will yield very

[6] See F. Crick's quote in: E. Fox Keller, *The Century of the Gene*, Cambridge: Harvard University Press 2000, p. 54.

[7] L.S. Liebovitch, *Fractals and Chaos*, New York: Oxford University Press 1998.

[8] N. Lesmoir-Gordon,W. Rood and R. Edney, 'Introducing Fractal Geometry, Cambridge: Icon Books 2000, p. 20-21.

[9] P.M. Iannaccone & M. Khokha, *Fractal Geometry in Biological Systems. An Analytical Approach*, Boca Raton: CRC Press 1995, p. 5.
[10] L.S. Liebovitch, *Fractals and Chaos*, New York: Oxford University Press 1998, p. 108.

complex yet ordered structures that repeat themselves.[11] Henri Poincaré showed that even complex behaviour ultimately consists of simple patterns that can be described with simple mathematic models.[12]

Many natural processes are random events that are structured by a generator. The result is a fractal.[13] These fractals are not as exact as mathematical models, but they do have a statistic self-similarity.[14] For instance, our lungs have one fractal dimension for the first seven generations and other dimensions in the bronchi.[15] It is likely that these structures are shaped by a genetically coded generator.[16] The gene prescribes the generator. In this way, a relatively low number of genes may suffice to account for a very complex body.[17] This idea is confirmed by the growth of different types of bacterial colonies. Bacteria only have about 1,000 genes, but their colonies have very complex fractal structures. The shape of the colony of different types of bacteria is also different. Genes determine the pattern of the colony, but the shape also depends on external factors. If other bacteria are encountered, the structure of the colony will change at the point of contact and some genes will be switched off.[18] In this way, a limited number of genes can cause very complex behavioural patterns to evolve.[19] Even at the gene level, cooperation is important. By working together, genes can produce more sophisticated and mutually beneficial structures.

The dependent gene

Thanks to fractal theory, we know that two genes could suffice to explain the form of leaves in plants. And knowing that, it is not so difficult to imagine how 1,000 genes can create different fractal patterns that make cells grow. Genes that are stable can spread. A gene on its own, however, will face

[11] Lesmoir-Gorden, Rood & Edney 2000, supra note 7, p. 43-44.
[12] Ibid., p. 50.
[13] Lesmoir-Gorden, Rood & Edney 2000, supra note 7, p. 63.
[14] Liebovitch 1998, supra note 9, p. 12.
[15] Lesmoir-Gorden, Rood & Edney 2000, supra note 7, p. 108.
[16] M. F. Barnsley, J.E. Hutchinson & Ö. Stenflo, 'Variable Fractals and Superfractals', Australian National University 2004.
[17] Liebovitch 1998, supra note 9, p. 24.
[18] T. Matsuyama & M. Matsushita, Morphogenesis by Bacterial Cells, in: Iannaccone & Khokha 1996, supra note 8, p. 127-129.
[19] Ibid., p. 151-155; M. Khokha & P.M. Iannaccone, 'Mosaic Pattern in Tissues from Chimeras' in: Iannaccone & Khokha 1996, supra note 8, p. 195 -198, 201.

serious difficulties trying to replicate and spread. It has to encounter the right molecules that are necessary for replication. The combination of a gene that generates a flagella and a gene that generates a device to capture the right molecules helps both genes spread faster. Selection will therefore be to the benefit of the gene combination. Nonetheless, the capture-device gene has to share the captured molecules with the flagella gene. Only if they find twice the number of molecules the separated ancestors needed, will the combination be successful.[20] Is the capture-device gene altruistic, because it shares its food with the flagella gene? Well, not exactly. Sharing is a necessity to find additional food. Without sharing, the flagella gene will not replicate and the capture-device gene will soon be isolated. It will probably be 'eaten' by a stable gene combination in which the capture-device gene does share. Is the not-sharing gene selfish? Well, no. It will not succeed and will be food for the cooperating gene combination. Genes are not altruistic, nor are they selfish: they depend on each other. Sometimes the cooperation of two genes is successful. In the same way, the cooperation of 1,000 genes can be successful. Such notions as egoism or altruism are not relevant on the level of genes. Genes generate fractals and sometimes the combination of two fractal patterns makes the underlying cooperating gene generators replicate faster. It is a matter of reciprocity.

Fractals are found on all biological levels: in molecules, in cells, in tissues, in organs and in organisms.[21] In addition, these structures also create fractal *movements*, as the beating of the heart,[22] respiration[23] and even the behaviour of crowds. Crowds behave in the same way as a complex organism.[24] Variation in biological processes is not random, but evolves in accordance with fractal theory. In a way, nature is deterministic, because a few simple mechanisms determine how processes will develop. Nevertheless, in the long term biological processes are unpredictable, because small disturbances in the environment can cause major alterations.[25] One could say nature is a

[20] See also W.D. Hamilton, 'The Evolution of Altruistic Behavior', *American Naturalist* 1963, p. 354-356.
[21] Iannaccone & Khokha 1996, supra note 8, p. 10.
[22] Lesmoir-Gorden, Rood & Edney 2000, supra note 7, p. 120.
[23] Liebovitch 1998, supra note 9, p. 23.
[24] Lesmoir-Gorden, Rood & Edney 2000, supra note 7, p. 130; C. Brown & L. Liebovitch, Fractal Analysis, London: Sage Publications 2010, p. 51-63.
[25] Liebovitch 1998, supra note 9, p. 162.

deterministic chaos.[26] No two ferns will be alike, yet they all have the same structure.

Let us assume that not only genes contain codes that work as a generator, but that some properties of genes – like stability, reproduction, need for nutrients, reciprocity and growth - act as generators for fractal patterns as well. In both cases, the environment acts as *initiator*. The fractal pattern can then be recognized in cells, organisms, groups and even states. If this is true, some simple but strong characteristics can be recognized on all levels. For the fractal structure to exist, it is essential that all levels are stable, that food is available and that replication takes place.

Thus, the mechanisms on a gene level can be recognized on the level of cells, organisms and groups. Multilevel selection will affect the spreading of genes.[27] When a gene mutates and this causes the organism to lose, for example, its flagella, then this combination will not survive. When a cell does not find food, this will be lethal to its generating genes. When an organism gets ill before it has reproduced the underlying genes will vanish. All kinds of selection on many levels are possible, but the mechanism is the same. Organisms are dependent to each other. An organism that does not cooperate with group members, where others do and punish free riders, will spread its genes less then an organism that cooperates within such a group. Groups that cooperate will be stronger then groups that do not. The non-cooperating groups probably will vanish.

Fractal gene theory acknowledges multilevel selection theory. However, fractal theory also shows that not all structures are the result of selection. Selection is the force that will eventually destroy structures that cannot maintain themselves. In the mean time, genes will produce all kind of forms. These forms not necessarily contribute to the fitness of the individual or the group. Nevertheless, genes that produce stable forms will exist for millions of years. Therefore, structures are created by people are build on genetic foundations that were successful for a very long time. In other words, the

[26] Ibid., p. 164.

[27] See also E. Sober & D.S. Wilson, *Unto Others: The Evolution and Psychology of Unselfish Behavior*, Cambridge: Harvard University Press 1998, p. 88.

appearance of different structures may differ, the building blocks, the basic principles on which they are build are the same.

Cooperation is important for genes to spread. Systems that improve cooperation between dependent units will therefore flourish also. In theory, it is possible that there is law outside the human realm, in a non-material world. In fact, it looks as if most people think there is. Shariff and Norenzayan showed that when such normative words as 'justice' and 'treaty' are used in the famous Dictator game in experimental economics,[28] people will share significantly more of their money than when only neutral words are used, just as when such religious words as 'God' and 'Holy' are used. Law is unconsciously regarded as being more authoritative than everyday facts.[29] It looks like even atheists unconsciously consider law to be at the same level of authority as religion. However, this dualistic vision lies outside the scope of science, which tries to comprehend our world without metaphysical explanations. We have no knowledge of law that exists in a metaphysical world, so the most logical conclusion has to be that law finds its cause in nature. Religious systems, as well as law systems, improve cooperation and will probably improve the spreading of underlying, dependent genes. More important is that law would not exist without the existence of genes as generators. Although this conclusion does not warrant reducing law to the properties of genes, genes as generators are an important factor in the genesis of law and therefore in the characteristics of law. This can be restated as the First Law of Evolutionary Genetics and Human Law:

Stable, replicating molecules are fractal generators that create life forms and their behaviour. Their characteristics are therefore essential to human law as an inherently biological behaviour-regulation system.

---

[28] In the Dictator game players get a certain amount of money of which they can voluntary give some to other players. *Homo economicus* should hold everything for him. However, most players will share some with there fellow players.

[29] A.F. Shariff & A. Norenzayan, 'God Is Watching You', *Psychological Science* 2007, p. 803-809; See also J.M. Bering, 'The Folk Psychology of Souls', *Behavioral and Brain Sciences* 2006, p. 453-462.

Proteins as mediators

Genes do not produce a trait or behaviour. First RNA and proteins have to be produced. When combined with other proteins, these proteins can be responsible for the production of cells and eventually other physical structures such as arms, legs, eyes and a brain. Proteins are also necessary for the production of hormones and neurotransmitters. Without genes as generators in an environment of molecules (initiator), there will be no brain, let alone a functioning one. By themselves, genes cannot make a brain. The genes inter react and the environment influences the inter reactions. The VMAT2 gene is a good example of how genes can be mistakenly seen to be responsible for a trait. Hamer calls it 'the God gene' because it would make people believe in God. Dawkins adds to the confusion by using such terms as 'the selfish gene' and 'replicator'. These names suggest that genes are self-centred, have vehicles that are designed to replicate genes or can directly produce certain behaviour. Of course, none of this is true. The VMAT2 gene codes a protein, a monoamine transporter. It can conserve monoamines like adrenalin, noradrenalin, dopamine and serotonin and release these neurotransmitters when a nerve cell fires. Genes are dependent and cooperate. Proteins can be considered means to make exchanges possible. Depending on the circumstances, these neurotransmitters can produce either depression or ecstatic feelings. They can make the border between the 'I' and the 'not-I' become diffuse, which some would call a spiritual experience. The VMAT2 gene has two variants, one with adenine, and the other with cytosine in identical positions. Individuals with cytosine were, according to Hamer's results, more spiritual than people with adenine. Hamer's conclusion was that there is a gene that makes people believe there is a God.[30] However, as Zimmer wrote, it is much more complicated. The VMAT2 gene only produces a transporter for various neurotransmitters. The VMAT2C gene perhaps releases the neurotransmitters earlier and in that way *contributes* to spiritual feelings in *a broad sense*.[31] By focussing to one gene, we overlook the

[30] D. Hamer, *The God Gene*, New York 2004. See also supra note 5.

[31] C. Zimmer, 'Faith-Boosting Genes', *Scientific American* 2004, p. 77-78.

importance of cooperation and exchange on the molecular level. One gene is nothing; thousand genes make a cell – together. Genes that 'contribute' will survive; genes that do not can be missed. Reciprocity is necessary to keep the system stable.

Three important things can be learned from this example. First, genes as generators are necessary for particular behaviour, but how that behaviour manifests itself also depends on other proteins and chemical substances that react with the proteins as a consequence of environmental factors. Generators can also influence each other, thus creating new forms. Second, genes have to cooperate and need reciprocal relations to produce sophisticated systems. Before a person can conclude he is 'one with nature' or that 'nature is God', there have to have been many inter reactions. Genes are necessary for a spiritual God-experience to occur at all, but one gene alone cannot produce that experience. Because of the context-dependent nature of the effect of genes on behaviour, it is impossible to calculate the consequences of any single gene.[32] Third, one should be very careful to translate genetic facts into explanations for human behaviour. Without those facts, there will be no human behaviour, but from a chemical fact on the level of molecules, there will be a complex process in the human body before it comes to a certain behaviour or thought.
This can be formulated as the Second Law of Evolutionary Genetics and Human Law:

Genes only indirectly cause certain types of behaviour. Genes as generators are a precondition for law but do not produce law in a direct way.

No determined behaviour, only predispositions

Natural selection sometimes can ensure that a trait is represented. However, this 'is no prima facie reason to think a trait which is adaptive in the earlier environment would manifest itself in the later one'.[33] Leiter and Weisberg call

[32] E. Mayr, *The Growth of Biological Thought*, Cambridge: Harvard University Press 1982.

[33] Leiter and Weisberg 2009, supra note 1.

this principle the Environmental Gap Objection. Nevertheless, the fact that the production of proteins has different effects in different environments is not an 'objection'. Phenotypic variation as a consequence of environmental influences is one of the most fundamental principles in evolutionary explanations of human behaviour. It explains the fact that two persons with identical genes, monozygotic twins, will behave differently when raised separately.[34] It explains why one of the two becomes a designer of cars and the other works in an aircraft factory. It explains why one of the two believes he is a child of God and the other is fascinated by the idea that his existence is possible because of stable, replicating molecules, so that he is ultimately one with Nature. It also explains why these separated twins continue to look very much alike, why their characters are so similar and why, in the same situation, they behave in very much the same way.

The environmental gap explains why the same group of genes might make people in a small group believe in ancestors that live on as good or bad demons, while people in complex societies tend towards believing in one almighty god.[35] Both groups of people believe - the fractal pattern is alike – but the environment influences the shape. The gap can also explain why people in small groups have strong systems of group morals where law systems evolve in complex societies. Smart rulers will use group morals and standards to make group members obey. They will expand the morals of their group to the society they lead as a whole. As Richerson and Boyd state, '[t]he symbolic unity of the early state may often have been as much the unity of the elite as the unity of society as a whole.' The elite not only use morals and norms, but also an abstract system of religious beliefs to unite the people. Uniting various groups requires abstract rules and an abstract deity that unites

[34] It can even explain how differences in the genetic makeup between twins derived from the same zygote can exist. The (chemical) environment has its effects as early as genes start to replicate or to produce proteins. E.g., C.E.G. Bruder, 'Phenotypically Concordant and Discordant Monozygotic Twins Display Different DNA Copy-Number-Variation Profiles', *The American Journal of Human Genetics* 2008, p. 763-771.

[35] P. Boyer, *Religion Explained*, London: Vintage 2002; D.D.P. Johnson, 'God's Punishment and Public Goods', *Human Nature* 2005, p. 410-466.

all other gods.[36] The mightier groups will expand the morals of their group to the society they lead as a whole.[37] It is bad to kill a group member, so it is bad to kill a member of society. It is bad to steal from your neighbour, so it is bad to steal from the king. It is good to help your brother, so it is good to help the government. Members of the dominant group initially parasitize on the subordinated groups, but as the groups dissolve and eventually form a society, they profit from the new order. The (fractal) pattern will be alike; however, more closely examined there are some differences. Genes generate the pattern; proteins and other environmental factors mediate and make differences in shape possible. Just like the structure of bacteria colony changes when other bacteria encounter, the behaviour can change in a different environment.[38] Nonetheless, by studying the gene as a generator important patterns in moral behaviour can be recognized. Moral systems, like law systems and religious systems, stabilize cooperating groups, so that group members and underlying genes can spread. If these systems in a group fail, the 'group will dissolve and will be replaced by other groups with a more robust social system'.[39]
One could argue cultural evolution takes place. Cultural evolution that not necessarily influences the spreading of underlying genes, because cultural evolution is a faster way to adapt to the environment. Still, the new culture that will evolve will have to be based on the same foundations as the older one. For example, the intuition that serious wrongdoing should be punished, seems to be universal. The amount of agreement on relative blameworthiness is also very high.[40] The most severe end and therefore the punishment continuum may differ. The average prison sentence In the Netherlands was in 1998 five months, while offenders in Columbia were imprisoned for a mean

[36] Dominic D.P. Johnson, 'God's Punishment and Public Goods', *Human Nature* 2005, 410-466

[37] It is well known that Hinduism developed following the invasion of India by the Arians, who had much more sophisticated weapons than the indigenous population of India. This elite formulated the Rigveda, a holy book that gave them godly powers and described godly morals.

[38] Matsuyama and Matsushita 1996, supra note 20, p. 127-129.

[39] Sober and Wilson 1998, supra note 30, p. 173, p. 189.

[40] Paul H. Robinson & Robert Kurzban, 'Concordance & Conflict in Intuitions of Justice', 91 *Minn. L. Rev.* 2007, p. 1872.

of 140 months.[41] The ranking of crimes however, does not differ. Emotions and preferences led to proto-moral and proto-legal systems.[42] Evolution has in particular contributed to intuitions that condemn physical harm, sexual harassment, the taking of property and cheating in exchanges.[43] Because the most successful strategy is to cooperate selectively with other cooperators, one must be able to discern unfairness. Individuals that cheat, injure group members or take a free ride must be punished. A psychological system that is able to compute when someone is a free rider therefore will improve fitness. Shared intuitions of justice contribute to this ability, will tune sanctions within the group and thus will reduce the number of transgressions.[44] In this way, cooperators will have the advantage. Retaliation and reward thus can be considered necessary in cooperating, reciprocal systems.[45] More, according to Damasio, emotions are critical for moral choice. Moral convictions 'require caring about others and powerful 'gut feelings' about right and wrong'.[46] Researchers of the Max Planck Institute found that chimpanzees retaliate immediately in cases of theft. One chimpanzee was given food. Then a second chimpanzee was placed in an opposite cage. The second chimpanzee could pull the food away from the first, so that he himself could eat from the food. When the second chimpanzee did this, the first began screaming. When given the first chimpanzee to pull a rope by which action all the food was spilled, he

[41] United Nations Office on Drugs and Crime, Seventh United Survey on Crime Trends and Operations of Criminal Justice Systems1998-2000, p. 66 and 308.

[42] E.g. Margereth Gruter & Roger D. Masters, 'Ostracism: A Social and Biological Phenomenon', Ehtology and Sociobiology 1986, p. 149-158; See also Hendrik Gommer, *From the 'Is' to the 'Ought'*, *ARSP* 2011 (accepted 3 January 2010, not yet published)

[43] Paul H. Robinson & Robert Kurzban & Owen D. Jones, 'The Origins of Shared Intuitions of Justice', *Vanderbilt Law Review* 2007, p. 1644-1646.

[44] Robinson, Kurzban & Jones 2007, supra note 46, p. 1646-1651.

[45] Frans B.M. de Waal, *Good Natured; The Origins of Right and Wrong in Humans and Other Animals*, 1996, p. 157-159.

[46] A. Damasio, *Descartes'Error: Emotion, Reason and the Human Brain*, New York, Putnam 1994; Frans B.M. de Waal, *Primates and Philosophers, how Morality Evolved*, Princeton University Press: Princeton 2006, p. 18.

did this immediately, although neither of the two could benefit of the food anymore.[47] This precocious view of morality also exists in ranking actions. Children consider physical harm more wrong than property violations and theft.[48] Doing physical harm is a prototypical moral violation to them.[49] Cultural differences do not influence this, although convention may create different perceptions on what is harm and what is not.[50]
Most of the characteristics of human (proto-)moral have been evolved by natural selection in the course of millions of years. These are the foundations on which law has to be build on, these are the building blocks that people will use when they will formulate new law. Cultural evolution may occur, but it will not take place outside these restrictions. No law system will be considered just that orders to kill all newborn infants or to rob people of all their property. Such a system will not be stable.

Consequently, I would like to rephrase the 'Environmental Gap Objection' as the Third Law of Evolutionary Genetics and Human Law:

Genes as generators will cause somewhat different fractal patterns in different environments. Therefore, law can have different appearances. Still, the properties of genes as generators will be the building blocks of the law.

---

[47] K. Jensen, J. Call & M. Tomasello, 'Chimpanzees are vengefull but not spiteful', *PNAS* 2007, 13046-13050. See also the film 'Ape Genius' of *PBS Nova*.

[48] Marie S. Tisak et al., 'Preschool Children's Social Interactions Involving Moral and Prudential Transgressions: An Observational Study', 7 *Early Education & Devevelopment* 1996, p. 137-139; Marie S. & Elliot Turiel, 'Children's Conceptions of Moral and Prudential Rules', 55 *Child Developmen,* 1984, p. 1030-1031.

[49] Marie S. Tisak & Jeanne H. Block, 'Preschool Children's Evolving Conceptions of Badness: A Longitudinal Study', 1 *Early Education and Development* 1990, p. 305.

[50] Elliot Turiel, Melanie Killen & Charles C. Helwig, 'Morality: Its Structure, Functions, and Vagaries', in Jorome Kagan & Sharon Lamb eds., *The Emergence of Morality in Young Children* 1987, p. 155-170; Cecilia Wainryb, 'Understanding Differences in Moral Judgments: The Role of Informational Assumptions', 62 *Child Development* 1991, p. 840-849.

An analogous example of this idea concerns the waist-to-hip ratio (WHR). Singh presented various sketches of underweight, normal weight and overweight women to male subjects. The males had a consistent preference for a WHR of 0.7.[51] Another study found that men considered women with a body mass index (BMI) of 18-20 as most attractive. It was also demonstrated that women with such a BMI were healthier and more fertile.[52] Nonetheless, there are cultures in which men prefer women with the highest WHR. The explanation offered by evolutionary psychologists is that the ancestral environment in such cultures was probably harsh. Women with a higher WHR would have higher fat storage and therefore have a better chance to survive and bear children. In other words, in such cultures too men chose the healthiest women.[53] Genes do not produce behaviour; they are generators that will predispose people towards particular behaviour. The environment can alter the behaviour *to a certain extent*.[54]

What genetical mechanisms can predict

This brings us to the 'Discovery Rationale'. According to Leiter and Weisberg, 'we have to predict the traits that will occur from evolutionary considerations'.[55] Working out the evolutionary origin of a trait is not enough. They rightly state that the interaction between genotype and environment is complex and non-linear. Even so, it has to be acknowledged that the details of this interaction are yet unknown. We have genes on one end of the scale, behaviour on the other, but the process linking them is still very opaque, and

[51] D. Singh, 'Adaptive Significance of Female Physical Attractiveness: Role of Waist-to-Hip Ratio', *Journal of Personality and Social Psychology* 1993, p. 298; D. Singh, 'Body Shape and Women's Attractiveness: The Critical Role of Waist-to-Hip Ratio', *Human Nature* 1993, p. 297-321.

[52] M.J. Tovée et al., 'Optimum Body-Mass Index and Maximum Sexual Attractiveness', *Lancet* 1998, p. 548.

[53] D.W. Yu and G.H. Shepard Jr., 'Is Beauty in the Eye of the Beholder?', *Nature* 1998, p. 321-322; J. Alcock, *The Triumph of Sociobiology*, Oxford: Oxford University Press 2001. p. 141-143.

[54] John Alcock, *The Triumph of Sociobiology*, New York: Oxford University Press 2001, p. 39.

[55] Leiter and Weisberg 2009, supra note 1.

evolutionary accounts are speculative. Be this as it may, genes as generators play an important role in how people behave and think. If this factor is ignored, the theory of behaviour will be neither complete nor sound. You can write a book about gymnastics without speaking of gravity, as Leiter and Weisberg state, but understanding gymnastics only is possible by studying gravity too. In addition, when you understand the effect of gravity on gymnastics you can use that knowledge to improve your skills. It will certainly work better than thinking that if your faith is strong, spirits can lift you into the air. Likewise, most books about law ignore the role of genes, but that does not mean knowledge of genes will not improve law.

The remark about spirits lifting you into the air may seem oddly out of place or flippant, it is in fact how some people conceive of the workings of the law. Some theories say that law develops in society and that 'therefore there is no biological theory possible',[56] society apparently being some kind of dualistic phenomenon that can exist without the physical brain of man.[57] If you keep up the faith in that law, it will work in society. Still, accepting that law has foundations in our genes, necessitates looking at genetic mechanisms to fully understand it. Eventually such explanations will give better results in improving the law than if one keeps searching for a dualistic source of law in society. Biological contemplation of law implies a monistic mindset. Religion, nationalism, law, they all find their *sine qua non* in our genes. Genes are important as they act as generators in a chaotic environment. Without at least understanding basic properties of genes, we can never fully understand the phenomenon of law. It may yet be impossible to determine how genes combine with certain traits, but properties of genes can predict how people will *tend* to behave.

Sociobiological theories of coercive sex will serve to illustrate my point. According to Thornhill and Palmer, rape was favoured by natural selection to

[56] E.g., P.C. Westerman, *The Disintegration of Natural Law Theory: Aquinas to Finnis*, Leiden: Brill 1997, p. 287-297.

[57] Emile Durkheim, *Les Jugements de Valeur et les Jugements de Réalité*, par. IV, 1911.

give sexually dispossessed males the chance to have children.[58] This explanation has been criticized.[59] Nonetheless, Jones states that 'the better law's model of human behaviour, the more efficiently it may be able to shape environmental conditions to shift behaviour in socially desirable ways'.[60] I agree with Leiter and Weisberg that this is too big a step.[61] By focussing on acts which are generally deemed reprehensible, such as rape, we are about to forget that what we find 'socially desirable' has biological causes too. During the war in Bosnia, the Serbs killed many Muslim men and Muslim women were routinely raped. It was 'socially desirable' for Serb soldiers to join their fellow soldiers in raping women. Without law and order, from a genetic point of view it can be profitable to rape women. This behaviour corresponds with the behaviour of male chimpanzees. When conquering new territories, they do not hesitate to kill other males to 'appropriate' females. If necessary, they will kill the newborns to restart the females' reproductive cycles.[62] Indeed, there could be in chimpanzees and humans an age-old connection between power and sex which may explain the inclination of men to rape women.[63] Rape is not just an act of 'sexually dispossessed males', it is how some might treat women when these men are not kept in check by morals and fellow community members. A recent report on sexual victimization of women in the Netherlands states that 12% of all women have been raped at least once in their life. Most of them were raped between the ages of 15 and 34, 98.4% of the rapists were male, and only 26.8 % of the rapists were unknown to the victim.[64]

---

[58] R. Thornhill and C. Palmer, *A Natural History of Rape*, MIT Press 2000, p. 30.

[59] E.g., E.A. Lloyd, 'Science Gone Astray: Evolution and Rape', Michigan Law Review 2001: 1536, 1546.

[60] O.D. Jones, 'Law and the Biology of Rape: Reflections on Transitions', *Hastings Women's Law Journal* 2000, p. 151-178, especially p. 158.

[61] Leiter and Weisberg 2009, supra note 1.

[62] A.E. Pusey, 'Of Genes and Apes', in: F.B.M. de Waal, *Tree of Origin*, Cambridge: Harvard University Press 2001, p. 9-38.

[63] F.B.M. de Waal, 'Survival of the Rapist', *New York Times Book Review* April 2, 2000.

[64] Rutgers Nisso Groep, *Seksuele gezondheid in Nederland 2009* , www.rutgersnissogroep.nl, e.g. p. 93.

How do these figures fit in the genetic approach I have described above? There probably is no 'rape gene'. From an evolutionary perspective, rape can be seen as following from the conflicting interests of men striving to spread their genes and of women aiming to bind their partners to them in order to protect their children. One of the reasons why we regard involuntary sex as rape is because it is not in the interest of spreading the genes of the victims. Their chances to have a protective partner and to have successful children will diminish. It is not socially desirable to be a rape victim, because it is more difficult to find a partner that will protect you when the child you are expecting is not his. It is not socially desirable to be a rapist, because other men and women will punish you, diminishing your chances of spreading your genes in future. This works differently in Bonobo groups. Bonobo females copulate with many males, because that behaviour stabilizes their society. Frequent copulation within Bonobo-groups will encourage the males to display the preferred behaviour; they will cooperate better and protect their females and offspring because it is not clear which male is the father of which young. Therefore, it is advantageous for females to use sex as a means of conciliation with males. In effect, females are dominant in the group.[65] If bonobos would be able to create a law system, their law system would definitely have other characteristics. An article against rape, for example, would not occur in bonobo law. There would be no Convention on the Elimination of All Forms of Discrimination against Women (CEDAW).[66] Human society generally does not work that way; it is mainly based on monogamous relationships. Men protect their female partners (and offspring) because protection ensures that they can be fairly certain the offspring is theirs. For women it pays to be picky and cautious in choosing a mate.[67] Women may therefore be naturally predisposed to caution and their aversion to forced sex is likely to be innate. On the other hand, most men probably

[65] F.B.M. de Waal, 'Apes from Venus', in: F.B.M. de Waal, *Tree of Origin*, Cambridge: Harvard University Press 2001.

[66] The Convention on the Elimination of All Forms of Discrimination against Women (CEDAW) was adopted in 1979 by the UN General Assembly.

[67] Ibid.

have the genes that could incline them to use their power to have sex with unwilling women.[68] For man the desire to mate is one of his strongest biological urges.[69] It depends on their social position whether it is favourable to do so. If you are a sexually dispossessed man of low status, you will probably not think in terms of future chances.[70] If you are a man of high power, you are likely to expect to escape sanctions; as a family member, you hope your transgression remains undetected;[71] if you are a friend, you may well think your victim will not expose you.[72] In a way, rapists are free riders. They challenge the rules of society, because they rely on being able to get away with it or because they have nothing to lose. If this is true, the only way to fight rape is for the perpetrators to be exposed and to be punished severely. The male unconscious, which is partly programmed to proliferate as effectively as possible, will react by avoiding violent sex against women. In line with Kitcher and Levy, it can be said that the goal of transforming society to the extent there is no rape is 'likely forever out of reach'. The cost of rape to men has to be made prohibitively high.[73] However, there will always be circumstances in which rapists can, or think they can, avoid the high costs. Nonetheless, for a group to flourish group members have to act in a reciprocal way. They contribute to the group so that they can profit of the benefits of group life. Alexander speaks of systems of indirect reciprocity. They involve social investment, which represents a short-term cost that may yield a long-term benefit.[74] These systems evolve 'automatically' within group moral

[68] E.g., F.B.M. de Waal 2000, supra note 66.

[69] M. Daly and M. Wilson, *Homicide*, Hawthorne, N.Y.: Aldine the Gruyter 1988.

[70] Thornhill and Palmer 2000, supra note 61, p. 67.

[71] Rutgers Nisso Groep 2009, supra note 67. 27.7% of the male rapists in the Dutch research were family members of the victim (fathers, brothers, uncles, etc.), p. 93, fourth column.

[72] Ibid. 44.3% of the rapists were partners, ex-partners, (school) friends or acquaintances of the victim, p. 93, fourth column.

[73] Citation of Neil Levy, *What Makes Us Moral*, Oxford: Oneworld 2004, p. 137; P. Kitcher, *Vaulting Ambition*, Cambridge: MIT Press 1985, p. 126-127; R. Boyd and P.J. Richerson, 'Punishment Allows the Evolution of Cooperation (or Anything Else) in Sizable Groups', *Ethology and Sociobiology* 1992, p. 171-195.

[74] R.D. Alexander, *The Biology of Moral Systems*, Hawthorne: Aline de Gruyter 1987, p. 111.

systems.[75] Reciprocity itself can be considered a generator that causes stable patterns in a cooperating environment, where food is essential. If this system of reciprocity is disturbed, group members will (have to) take action to restore balance. Law will be formulated in line with these predispositions. A law that is in line with, evolutionary evolved, proto-moral will be considered just. Therefore, (proto-)moral can be recognized in all law systems. Not that law itself necessarily warrants the spreading of underlying genes. Still, it will have a structure that is congruent to evolutionary evolved proto-moral. Law will be build on the foundations of proto-moral and building blocks of human nature will be used to build the systems.

The above allows us to formulate the Fourth Law of Evolutionary Genetics and Law.

Law systems will evolve congruous to proto-moral that has been evolved by natural selection of genes. Thus, in law one will recognize characteristics that genes also have.

A stable society as a consequence of stable, replicating molecules

According to Keeley, 95% of the native Indian tribes were at war with each other, causing roughly 0.5 % of the population to die. Even the Twentieth Century state wars would have had a death-rate twenty times higher if the world's population were still organized into non state tribes. For example, at Crow Creek in South Dakota, 'archaeologists found a mass grave containing the remains of more than 500 men, women and children, who had been slaughtered, scalped and mutilated during an attack on their village".[76] This happened around 1325 CE. Mostly tribes needed women from other tribes to maintain a genetically healthy population, most conflicts were therefore about abduction of women.[77] Although the total number of killed people in the wars of the twentieth century was about 150 million, there would have been 'more

[75] Ibid., p. 95.

[76] L.H. Keeley, *War before Civilization*, Oxford: Oxford University Press 1996, p. 38.

[77] Ibid., p. 83-87.

than 2 billion war deaths since 1900' if one applied tribal death rate.[78] Keeley concludes 'the only practical prospect for universal peace must be more civilisation, not less.'[79] The disadvantage of a high death rate and a shortage of women can diminish when groups are integrated and stabilized in bigger societies where law and order rule. For instance, in the Netherlands in the 15th century 35 murders per 100,000 people were committed annually. In the 1970s this was one per 100,000.[80] It looks like people are more secure in a stable society with law and order, where people follow the rules and free riders are punished. When rape and other kinds of violent behaviour are undesirable in a stable society, people will generally take action against such behaviour. A society where there is a law against rape can grow and the genes of the individuals that participate in it can prosper. Similarly, stable molecules that replicate will prosper in a stable DNA, in a stable chemical system in which proteins can line up to create a stable organism. Those stable organisms will prosper in stable groups and societies. Genes as generators indirectly cause stable societies to flourish. In a stable society, people are better able to provide food and to defend themselves against intruders. Free riders are punished and people know what to expect. Reciprocity is more likely: people will feel it is their duty to help fellow members of society. Not that the legal system evolves because of natural selection, so that genes will be selected that cause legal systems to occur. People will unconsciously favour rules that are congruous to proto-moral. Thus proto-moral will be recognized in law systems. Law systems make it possible that the trible morals are enhanced so that they can work in a complex society. Still, these law systems will have according characteristics. The law will in this way favour the genes of civilians, just as proto-moral favours the survival of the genes of group members.

[78] Keeley 1996, supra note 79, p. 93.

[79] Keeley 1996, supra note 79, p. 214.

[80] M. Eisner, 'Long-term Historical Trends in Violent Crime', in: M. Tonry (ed.) *Crime and Justice. A Review of Research,* Chicago: Chicago University Press 2003, p. 84-142; see also P. Spierenburg, *A History of Murder. Personal Violence in Europe from the Middle Ages to the Present*, Cambridge: Polity Press 2008, p. 4.

In a society where everyone who cooperates benefits, we *ought* to behave in a reciprocal way to spread our genes. In fact, genes programme people to cooperate. The necessity to cooperate, will make people *feel* they ought to cooperate.[81] As Hume already noted, our sense of duty follows the common and natural course of our passions.[82] Law will take shape by our joint unconscious effort. In law, our feelings of how one *ought* to behave will be projected. Our own interests cause these feelings, but at the same time, we realize law and order offer us many benefits. Certainly, ancient genetic mechanisms have been precipitated in law, intermediated by our feelings and unconscious thoughts. There is a pragmatic reason to cooperate in a stable society: cooperation is in the interest of other group members on whom we depend. [83] Social norms can regulate even the behaviour of unrelated people in large groups.[84] Group members *sense* this when they exhibit socially desirable behaviour, because this *feeling* is a projection of what is good for their genes. Socially undesirable conduct will trigger gossip and peer pressure to conform.[85] Group members will engage in social censure by greeting non-conformists coolly, by criticizing or ridiculing, or even by ejecting them from the group.[86] On the other hand, people that promote morals and social harmony will find it easier to form beneficial relationships because their

[81] See also Sober and Wilson 1998, supra note 30, p. 200-201.

[82] David Hume, *A Treatise of Human Nature*, ed. L .A. Selby-Bigge, Oxford: Oxford University press 1888, p. 469-470. Book II, Part 2, Section I.18.

[83] Joseph Henrich, 'Demography and Cultural Evolution: How Adaptive Cultural Processes Can Produce Maladaptive Losses. The Tasmanian Case', *American Antiquity* 2004, 197-215.

[84] Sober and Wilson 1998, supra note 30, p. 107.

[85] J.B. Haviland, *Gossip, Reputation and Knowledge in Zinacantan*, Chicago: University of Chicago Press 1977; H.F. Todd Jr., 'Litigious Marginals: Character and Disputing in a Bavarian Village', p. 86-121, in: L. Nader and H.F. Todd (ed.), *The Disputing Process*, New York: Columbia University Press 1978; R.B. Edgerton, *Deviance: A Cross-Cultural Perspective*, Menlo Park: Cummings 1975.

[86] C. Boehm, 'Egalitarian Society and Reverse Dominance Hierarchy', *Current Anthropology* 1993, p. 227-254.

reputation is good. In addition, being good in the eyes of fellow group members pays off reproductively.[87]

A large society is too big to be stabilized by morals only, so what is needed is a systematized and enforceable set of conduct. This system can regulate the actions of the members of society. If people behave in accordance with these rules, they will live and prosper. When people comply with the legal system, society will become more stable and its members will *feel* there is 'justice'. Legal rules within society develop because bigger groups cannot be stable without these rules. People form rules to stabilize society, because a stable society will improve their chances of survival and reproduction. Rules minimize tensions between group members. The rules are more or less formed unconsciously in a historical process and periodically rationalized and written down. A predisposition towards group morals and group rules may imply a predisposition towards a legal system (cf. the Third Law as defined above). With systems of law, we can build societies that are much bigger and complex. This success is ultimately based on a number of genes that as generators have made it possible for humans to imitate, to be empathic, to evolve morals from feelings and to punish in an altruistic way. In a stable society, we relinquish a portion of our freedom of reproductive choice in order to suppress free riders and enable the cooperation of millions of people. In this way, we still advance our genetic cause. To put it differently, genes (and genes that combine with them) that make it possible to build moral systems have an advantage over genes that do not.[88] People without such a system, are at a disadvantage and will fall prey to natural selection.[89] Therefore, when we say that we ought to obey the law, we are essentially saying that it is an evolutionary fact that if we obey the law, our society will be stable and the

[87] C. Boehm, 'Explaining the Prosocial Side of Moral Communities', in: P. Clayton and J. Schloss (eds.), *Evolution and Ethics*, Cambridge: W.B. Eerdmans Publishing Company 2004, p. 50-77.

[88] See also R. Vaas and M. Blume 2009, supra note 5, p. 117-130, who show how religious societies with strong rules expand far more quickly than non-religious societies. Its members have more children and they are - therefore? - preferred by other young people.

[89] Sober and Wilson 1998, supra note 30, p. 173.

chances for our genes to prosper will improve.[90] Does this mean law has evolved by natural selection? No! Law systems are the precipitation of proto-morals. Proto-moral has evolved in millions of years by natural selection. Just law will therefore prescribe how people ought to act to live in a stable group, in accordance to biologic mechanisms.
This reasoning can be formulated as the Fifth Law of Evolutionary Genetics and Law.

Law systems are the precipitation of unconscious proto-morals. Law is in this way effectively a consequence of some genes that at least most of us have. Warranting reciprocity will be an important aspect of law.

Law as a consequence of stable, replicating and cooperating molecules

Norms and legal rules are only useful when they are observed by the good majority of the population and are enforced on those that do not comply.[91] The people must be satisfied that any sanction imposed is just so that they feel free riding is not a profitable strategy.[92] Although the interaction between genotype and environment is complex and non-linear, it is reasonable to assume that people are predisposed towards stable societies that offer security. We still do not know the details of what makes people exhibit free-rider behaviour. We do know that a stable society that suppresses these free riders will enable people (and their genes) to prosper. Our genes make us pursue a stable society, and that pursuit therefore gives us joy. As Levy puts it, 'evolutionary psychology thus seems to have policy implications: we should encourage people to pursue the lives for which they are evolved.'[93] For us humans this means that we should aspire to social lifestyles, which includes observing legal regulations, because law makes it possible to live in a

[90] In 'From the 'Is' to the 'Ought': A Biological Theory of Law' I argue how facts and norms are linked (accepted 3-01-2010 by *ARSP*).

[91] M.D. Hauser, *Moral Minds*, New York: Harper Collins Publishers 2006, p. 99.

[92] A. Goldman, 'The Paradox of Punishment', *Philosophy and Public Affairs* 1979, p. 42-58.

[93] Levy 2004, supra note 76, p. 138.

complex society. Spellbound by our genes, we cannot help but think in this way. Dunn for instance, found that even children aged 16 and 36 months spontaneously offered to share in order to win the approval of their family.[94] Before they can talk, children offer food to establish friendly relations.[95] Children even teach each other moral rules.[96] The mere discovery of how ethics evolve will not prompt people to act much differently. The normative demand is not an illusion, but as much a reality as facts are.[97] We have to act in accordance with group rules, because if we do not we will be exiled and possibly die. We certainly will feel unhappy. Sympathy for non-kin is also a disposition to secure the nurturance of children for the long period that is needed to let the brain fully develop.[98] Group moral helped humans to survive for at least a million years. Therefore, there have to be some moral principles, which are universal and are part of human nature in a way men cannot ignore them.[99] Discovering that the origin of our ethical striving has been programmed by groups to let group members work in favour of the group, probably will not cause us to reject these universal morals. If the clownfish were to discover that its dwelling among the tentacles of anemones protects it against predators, it would probably not stop helping the anemones: the anemone's stings offer the clownfish effective protection.[100] We tend to dislike people that do not abide by the rules, because we feel that they are taking advantage of our cooperativeness. Therefore, murderers, thieves and rapists have to be punished. Not because there is an idealistic rule that comes to us from a spiritual, dualistic world, but because our genes as generators – indirectly and metaphorically - tell us so. Hare states that the discovery of the genetic origin of normative demands undercuts that demand. People would

---

[94] J. Dunn, *The Beginnings of Social Understanding*, Oxford: Basil Blackwell 1988.

[95] I. Eibl-Eibesfeldt, *Human Ethology*, New York: De Gruyter 1989, p. 340-341.

[96] J. Piaget, *The Moral Judgment of the Child*, New York: Free Press 1965.

[97] See Gommer 2011, supra note 45, for how to derive norms from facts.

[98] J. Q. Wilson, *The Moral Sense*, American Politcal Science Review 1993, p. 1-12.

[99] M. Ruse, *Can a Darwinian Be a Christian?*, Cambridge: Cambridge University Press 2001.

[100] D. Davenport and K. Norris, 'Observations on the Symbiosis of the Sea Anemone and the Pomacentrid Fish', *Biological Bulletin* 1958, p. 397-410.

think about a way to escape those group demands that are not in their benefit. If the normative demand is an illusion, produced by our genes, people would be less inclined to be helpful to others. 'A normative theory should be able to make public what it claims as the source of origin of the normative demand, without thereby undercutting the demand.' [101] However, human genes cannot survive without humans that are helpful and cooperative. The normative demand is no illusion and to the benefit of groups *and* group members. Just as on the molecular level genes depend on each other, individuals depend on each other. Only groups that successfully inhibit free riders will be stable enough to survive. The trait to punish free riders will therefore be as strong as the trait to free ride. The trait to cooperate will be as important as the trait to care for oneself.

The Sixth Provisional Law of Evolutionary Genetics and Law can now be formulated as follows:

Genes are stable, replicating and cooperating molecules. Genes effectively are the original cause of biological stable systems. They will prosper in a stable, reciprocal environment.

Individual sacrifice to the benefit of group stability

Genes prosper in stable organisms and in stable groups. This implies a tension between the benefit of the individual and the group. Alexander remarks a constant tension between individuals that strive for maximum benefit within their group. Membership yields safety and extra resources, but 'group living cannot be expected to last and be elaborated unless it leads to increased reproductive success among all participants'.[102] As Richerson and Boyd put it, '[w]e have evolutionary debts to individual autonomy, family, and tribe that

[101] J. Hare, 'Is There an Evolutionary Foundation for Human Morality?', in: P. Clayton and J. Schloss (eds.), *Evolution and Ethics*, Cambridge: W.B. Eerdmans Publishing Company 2004, p. 187-203.

[102] Alexander 1987, p. 79-81.

must be paid.'[103] In some cases however, the individual will – has to? - sacrifice itself for the benefit of group stability because stability is more important in the long run. For instance, if our genes tell us not to accept rape, why have 12% of Dutch women been raped?[104] One explanation could be that in the past women (and men) did not stand up to rapists in their direct neighbourhood so as not to disturb the stability of the group. They condoned rape in the interest of the group, thereby effectively submitting to male domination (as, e.g., in male-led worship). Yet, by acknowledging men's power, women also made men more inclined to invest in family and society, the mightiest of men even without fathering children themselves.[105] Because women will find it easier to stand up against men that do not take part in society, they will easier admit they were raped by sexually dispossessed men, than by mighty group members. These men of lower status can easily be exposed without endangering the stability of society. It is actually easier to recognize coercive sex with these men as rape. It is more difficult to accept that rape is something that, under the wrong circumstances, *most* men are capable of. Civilized men do not do such things. Indeed, civilized men - men that participate in and defend their stable society - should not, and therefore mostly will not, do such things. They have too much to lose. They also benefit from a safe, stable society without free riders. On the other hand, as Martin shows, women will subjectively experience men with resources as more sexually desirable. This implies that women under certain circumstances are more likely to find men attractive who dominate them.[106] This also explains why Thornhill and Palmer found that women raped by attractive men inadvertently experienced 'sexual arousal'.[107] It will be easier for a dominant man to do things that women do not want. Rape by an attractive man can stir ambivalent feelings in his victim. Dominant men are attractive, but rape is not.

---

[103] P.J. Richerson and R. Boyd, 'Darwinian Evolutionary Ethics', in: Phillip Clayton & Jeffrey Schloss (eds.), *Evolution and Ethics*, Cambridge: W.B. Eerdmans Publishing Company 2004, 50-77

[104] Rutgers Nisso Groep 2009, supra note 67, p. 17.

[105] Vaas and Blume 2009, supra note 3, p. 141.

[106] J.L. Martin, 'Is Power Sexy?', *American Journal of Sociology* 2005, p. 408-446.

[107] Thornhill and Palmer 2000, supra note 61, p. 70.

This ambivalent reaction can trigger feelings of guilt. From an evolutionary point of view, it is not clear if rape by a healthy, strong man is an advantage. The offspring probably will be more successful than if the father would be weak and of lower status.

For rapists, on the other hand, there can be a significant evolutionary advantage. Of the women that were raped in the Netherlands 6.9% became pregnant,[108] which from a clinical perspective is a significantly reproductive benefit.[109] If this were a net benefit, not outweighed by costs, rape as a reproductive strategy would increase rapidly. It is therefore likely that rape will continue (and even increase) in situations where the male unconscious will estimate the costs to be low. In a stable, male-led society, a system of control, honour, law, coercion and punishment has to keep men 'civilized'. Law as a precipitation of what we feel as evolutionary advantageous will support to this 'civilisation'. However, this system does not come from the outside, it grows within communities because the genes that benefit from a stable society - where free riders will face high costs – indirectly will cause it to evolve. When individual group members act as free riders, the other group members will experience this behaviour as unjust. They will take action to restore the balance. They will punish the free riders and overwhelm the benefits of the free rider behaviour.[110]

This reasoning leads to the seventh and final Provisional Law of Evolutionary Genetics and Law.

The tendency for group stability causes individuals to sacrifice some of their benefits. Law can help to keep a balance between the individual's interests and the group's interests. This balance is experienced as justice.

---

[108] Rutgers Nisso Groep 2009, supra note 67, p. 18.

[109] Thornhill and Palmer 2000, supra note 61, p. 121; J. Maynard Smith, *Evolution and the Theory of Games*, Cambridge: Cambridge University Press 1982; R. Dawkins, *The Selfish Gene*, Oxford: Oxford University Press 2006 (first published 1976), p. 66-87.

[110] Boyd and Richerson 1992, supra note 76.

What law can learn from 7 million years of evolution

The question Leiter and Weisberg ask is why should law care how behavioural traits evolved, where most biological literature is not about humans at all? One of the answers to this question is that humans share many genes with animals. The genetic difference between humans and other animal species is not as big as is sometimes suggested. As Moss points out, we share more than 98% of our genes with other primates. Moreover, we only have 30,000 of them, around the same number as mice. What is more, a considerable amount of genes, the so-called Hox genes, we share with fruit flies. Presumably, these genes are responsible for the development and integration of essential body components.[111] However, not only body components have strong genetic origins. The moral community is a human universal, that is also found among all great apes. It seems necessary to have morals to keep a group of aggressive individuals working together.[112] According to Lorenz, aggressive instincts needed inhibitions to keep aggression under control. Apes help others to stop fighting, probably because of their empathic capacities.[113] Apes probably feel that if another ape can be hurt, they themselves can be hurt, so they have to help the ape that is being hurt. However, morals among apes are poorly communicated.[114] In gorilla troops, intervention generally consists of a 'pig grunt' or a physical action from the silverback.[115] Bonobos have a variety of reconciliatory techniques, most of which include sex.[116] Chimpanzee males shout at each other but

[111] S.J. Gould, *The Structure of Evolutionary Theory*, Cambridge: Harvard University Press 2002.

[112] C. Boehm, 'Explaining the Prosocial Side of Moral Communities', in: P. Clayton and J. Schloss (eds.), *Evolution and Ethics*, Cambridge: W.B. Eerdmans Publishing Company 2004, p. 78-100; C. Boehm, 'Die evolutionäre Entwicklung der Moral', in: M. Gruter and M. Rehbinder, *Der Beitrag der Biologie zu Fragen von Recht und Ethik*, Berlin: Duncker & Humblot 1983.

[113] M.D. Hauser, *Moral Minds*, New York: Harper Collins Publishers 2006, p. 285.

[114] Ibid., p. 37-44.

[115] D. Fossey, *Gorillas in the Mist*, Boston: Houghton-Mifflin 1983

[116] Pusey 2001, supra note 65.

seldom hurt group members. After about ten minutes of screaming, they reconcile by stretching out a hand.[117] When reconciliation fails, an older female will mediate by physically joining their hands.[118] A female will go to a dominant male for help if other females threaten her infants.[119] Considering the different characteristics of different species of apes and humans, will make it possible to recognize what factors are important factors in human law. As I showed, bonobo law systems would be different from human law systems. This is because the law is a precipitation of biological predispositions. Language enabled humans to resolve conflicts by means of communication.[120] Using language, humans could communicate morals and instruct children and other group members in them, and a moral system could evolve. Although evolution took place in small groups, the mechanism of a moral system also works in large societies in which underlying morals are translated in rules that can be communicated more easily.[121] The disposition to use morals and language made it possible to build large societies, but language also improved cheating skills.[122] The temptation to solely go for individual genetic furtherance humans share with all other organisms, and as humans also share most of their genes with those organisms this temptation cannot be ignored.[123] This temptation is the main driving force of evolution. On the other hand, morals are essential for *human* society. Evolutionary biology can help legal regulation by emphasizing that intervention by strong – or wise – group members is vital to our society. If some prefer the pursuit of individual gain,

---

[117] F.B.M. de Waal and A. van Roosmalen, 'Reconciliation and Consolation among Chimpanzees', *Behavioral Ecological Sociobiology* 1979, p. 55-66.

[118] F.B.M. de Waal, 'Evolutionary Ethics, Aggression and Violence: Lessons from Primate Research', *Journal of Law, Medicine & Ethics* 2004, p. 18-23.

[119] M. Gruter, 'The Origins of Legal Behavior', *Journal of Social and Biological Structures* 1979, p. 44.

[120] R.A. Hinde, *Individuals, relationships and culture*, Cambridge: Cambridge University Press 1987, p. 5.

[121] See also Sober and Wilson 1998, supra note 30, p. 141.

[122] F.H. Willhoite, 'Rank and Reciprocity: Speculations on Human Emotions and Political Life', in: E. White (eds), *Sociobiology and human politics*, Lexington: Lexington Books 1981.

[123] R.D. Alexander, *The Biology of Moral Systems*, New York: Aldine de Gruyter 1987, p. 33.

we should remind them of the 7 million years of evolution in which morals have proven their benefits to our ancestors and our species as a whole.
In short, by studying the genetic and biologic foundation of law, we will improve our understanding of law systems. This will eventually lead to efficient law systems that support societies in which people feel happy, because these societies meet their needs.

Conclusion

Leiter and Weisberg venture that the fascination with 'law and evolutionary biology' is probably caused by 'various hobby horses of the right: people are 'selfish', law can't change everything, nature puts limits on utopian aspirations, and the like'. However, do these statements adequately reflect what modern evolutionary biology tells us? I do not think so. They are bold statements that can be refuted with recent knowledge. Law was not introduced by some extraterrestrial powers to civilize selfish humans and to restrain some of their more unruly biological inclinations: it is a product of evolutionary processes. Maybe law cannot change everything, but it certainly has changed much to the benefit of our genes and therefore to the benefit of ourselves. On the other hand, law is a precipitation of proto-morals. Justice will therefore never be found if our biological needs are not met.

Genes as generators can have different effects in different environments, so the traits that are made possible by these genes can also be different. The crux lies in the mechanisms driving evolutionary genetics. They can help us discern basic patterns of human behaviour and social evolution. In addition, properties of genes can predict how people will *tend* to behave. In a society where everyone who cooperates benefits, we *ought* to behave in a reciprocal way to spread our genes. Genes effectively program people to cooperate; they *feel* they ought to cooperate. When behaviour is considered socially undesirable, it is probably not to the genetic advantage of the group members. Law, exposure and punishment can diminish deviant behaviour, because such a response generally puts the perpetrator at a genetic disadvantage. Law systems are a precipitation of the mechanism. Stable, replicating and reciprocal molecules

are the ultimate cause of stable systems. They will prosper in a stable DNA, in stable organisms and in stable groups and societies. Thus, law systems that stabilize society are in essence an extended phenotype of those genes. They warrant reciprocity in complex societies. Reciprocity that itself can be seen as a generator that in a fractal like way causes reciprocal relations at all biological levels. In addition, people can be argued to be at least as altruistic as they often considered to be selfish, because they tend to form stable societies all or at least most of whose members prosper. However, it is probably more accurate to state that people depend on each other. Members that strive to reproduce themselves, but that also cannot live without one another. In this respect, the pattern is no different at the level of the gene, the cell, the organism or the group. Law has been and still is a vehicle of change and it has helped genes that facilitated its rise prosper. Nevertheless, nature also puts limits on utopian aspirations. Although humans tend to form stable societies, there will always be the temptation of free riding. People flourish on law and order, but if a tempting opportunity arises, they may try to seize it. Just like genes also compete to one another. In order to maintain a social, reciprocal equilibrium, those that cannot resist this temptation should be kept in line, so that the benefits of transgressing are outweighed by its costs. Law as a precipitation of these mechanisms will support this equilibrium.

By recognizing genes as a *conditio sine qua non* for law, as generators that are indispensable for the development of law, it will be easier to integrate law, sociology, anthropology, psychology and biology. This will help to study law in a more empirical way without reducing law to biological facts, because that cannot be done. Interaction between humans, interaction of humans with their environment and interaction between ideas is also necessary for law to evolve. Nonetheless, the study of evolutionary genetics will improve our understanding of law. No scientist or philosopher will idly wait until there is enough material to think about. Theories, including the speculative and contentious ones, can help us interpret and understand new scientific facts.

University of Tilburg – The Netherlands
Warandelaan 2,
Tilburg.

Hendrik Gommer
De Bongerd 2A,
NL-9801 AS Zuidhorn.
The Netherlands
0031-6-55751097
h.gommer@uvt.nl; hendrikgommer@hetnet.nl